SVKM's
D. J. Sanghvi College of Engineering

Program: B.Tech in Electronics Engineering **Academic Year: 2022** **Duration: 3 hours**
Date: 09.01.2023
Time: 10:30 am to 01:30 pm
Subject: Artificial Intelligence and Machine Learning (Semester VII) **Marks: 75**

Instructions: Candidates should read carefully the instructions printed on the question paper and on the cover page of the Answer Book, which is provided for their use.
(1) This question paper contains two pages.
(2) All Questions are Compulsory.
(3) All questions carry equal marks.
(4) Answer to each new question is to be started on a fresh page.
(5) Figures in the brackets on the right indicate full marks.
(6) Assume suitable data wherever required, but justify it.
(7) Draw the neat labelled diagrams, wherever necessary.

Question No.		Max. Marks
Q1 (a)	Draw and describe the architecture of Utility based agent. How is it different from a Model based agent?	[10]
	OR	
Q1 (a)	Explain in brief the categorization of AI.	[10]
Q1 (b)	Explain in brief the components of AI.	[05]
Q2 (a)	Differentiate between the informed and uninformed search methods with examples.	[10]
Q2 (b)	Explain the Iterative deepening depth-first search.	[05]
	OR	
Q2 (b)	Explain the greedy best first search algorithm with an example.	[05]
Q3 (a)	Explain the process of knowledge engineering using an appropriate example.	[10]
Q3 (b)	Explain the following terms with respect to first order logic. i. Syntax of First-Order logic ii. Atomic sentences iii. Complex Sentences iv. Universal Quantifier v. Existential Quantifier	[05]

	OR	
Q3 (b)	Translate these sentences into formulas in predicate logic. i. All birds fly. ii. Every man respects his parent. iii. Some boys play cricket. iv. Not all students like both Mathematics and Science. v. Only one student failed in Mathematics.	[05]
Q4 (a)	Find the weights using the perceptron learning rule for NAND function. The network uses bipolar inputs and targets. Assume the initial weights and learning rate and run the algorithm for 2 epochs.	[10]
	OR	
Q4 (a)	Explain the various learning paradigms with proper diagram and examples.	[10]
Q4 (b)	Explain the issues encountered in machine learning.	[05]
Q5 (a)	**Solve any two :** i. Explain the concept of linear regression with example. ii. Write a short note on Principal Component Analysis (PCA). iii. Explain the various activation functions used in a Neural Network. iv. Explain the expectation maximization algorithm.	 [05] [05] [05] [05]
Q5 (b)	Explain Kohonen's self organizing feature map.	[05]